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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/813,714	03/21/2001	Solomon Davidovich Labinov	6321-194	3357

7590

08/11/2004

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EXAMINER
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DUONG, THANH P

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 08/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/813,714

Applicant(s)

LABINOV ET AL.

Examiner

Tom P Duong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 88-102 is/are pending in the application.
- 4a) Of the above claim(s) 71-87 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 88-102 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 6/20/02 9/18/02
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

Restriction to one of the following inventions is required under 35 U.S.C.

121:

- I. Claims 71-87, drawn to a method for converting fuel energy to electricity, classified in class 48, subclass 197R.
- II. Claims 88-102, drawn to a system for converting fuel energy to electricity, classified in class 48, subclass 127.9.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice.

The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, the process as claimed can be practiced by another materially different apparatus such as the use of a hydrogen separating membrane made of palladium or ceramic other than carbon fiber composite molecular sieves (CFCMS).

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

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Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

During a telephone conversation with Mr. Nelson A. Gregory on July 19, 2004 a provisional election was made with traverse to prosecute the invention of Group II, claims 88-102. Affirmation of this election must be made by applicant in replying to this Office action. Claims 71-88 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

#### ***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on 8/28/02 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claim 102 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 102, in light of specification on page 11, lines 19-21, it is best understood by examiner that the "synthesis gas" output from the reformer 102 supplied to the turbine 120 is at a pressure of 40 atm. Thus, the recitation of a natural gas supplied to reformer at a pressure of at least approximately 40 atmosphere does not particularly point out Applicant's invention.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 88, 91, 94-95, 98, and 101-102 are rejected under 35 U.S.C. 103(a) as being unpatentable over La Pierre et al. (6,348,278) in view of Kaneko (4,923,768). Note, the system is being examined as an apparatus. Regarding

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claims 88, 94-95, and 101, La Pierre discloses a system for converting fuel energy to electricity (Fig. 2), comprising: a reformer (12) for converting a higher molecular weight gas (hydrocarbon, Col. 7, lines 14-18 and methane gas, Col. 7, line 36) into at least one mixed gas stream of lower average molecular weight (Col. 8, lines 46-51) comprising at least a first lower molecular weight gas (H<sub>2</sub>) and a second gas (CO) said first and second gases being different gases; a separator (14) for dividing said mixed gas stream into a first gas stream mainly comprising said first lower molecular weight gas (via line 40) and a second gas stream mainly comprising said second gas (CO). La Pierre fails to disclose at least one turbine to produce electricity from expansion of said mixed gas stream; and mixed stream being directly provided to said turbine from said reformer without additional steps for either compressing or heating said mixed gas stream. Kaneko teaches the exhaust gas from a reformer 2 can be fed directly to the turbines (10,12) to generate electricity (Col. 4, lines 40-45) and collect power energy to be utilized in other area of the power generation system such as the compressor 8 (Col. 4, lines 50-59). Thus, it would have been obvious in view of Kaneko to one having ordinary skill in the art to modify the apparatus of La Pierre with a mixed gas (exhaust gas) fed directly to the turbine as taught by Kaneko in order to drive the turbine to produce electricity for use in other area of power generation system. Regarding claim 91, La Pierre discloses a portion of the heat (recycled fuel cell water vapor 80) to the reformer 12 to improve energy efficiency usage in the system (Col. 12, lines 17-34 and Col. 2, lines 60-65). Regarding claim 94, La Pierre discloses the pressurized hydrocarbon (high

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molecular weight gas) stream is delivered to the reforming reaction zone (Col. 6, lines 49-52). Regarding claim 95, La Pierre discloses the high molecular weight gas contains methane (Col. 16, lines 35-38) and is reformed by a reformer 12 to produce a first low molecular weight gas, H<sub>2</sub> and a second low molecular weight gas, O<sub>2</sub> (Col. 1, lines 30-49). Regarding claim 98, La Pierre discloses the output streams from the fuel cell 52 are supplied to the combustor 94 via line 92.

Regarding claim 102, it is obvious that Kaneko discloses the synthesis gas to the turbine 10 (best understood by examiner) with a supplied pressure of at least 40 atmosphere in order to drive the gas turbine to produce electricity.

3. Claim 89 is rejected under 35 U.S.C. 103(a) as being unpatentable over the applied references (La Pierre et al. '278 in view of Kaneko '768) as applied to claim 88 above, and further in view of Burchell et al. (6,375,716). The applied references disclose any type of hydrogen separating membrane may be used to separate hydrogen from the other reaction products in the reformat stream (Col. 8, lines 56-58) but fail to disclose the separator is a carbon fiber composite molecular sieves (CFCMS). Burchell teaches the use of a CFCMS separator (Col. 3, lines 4-20) to separate the hydrogen from the carbon monoxide and other gas mixtures (Col. 5, lines 45-52). Thus, it would have been obvious in view of Burchell to one having ordinary skill in the art to substitute the hydrogen separating device of La Pierre with a CFMS separator as taught by Burchell to provide an alternative separation device for separating hydrogen from carbon monoxide.

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4. Claims 90, 96-97, and 99-100 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applied references (La Pierre et al. '278 in view of Kaneko '768) as applied to claim 88 above, and further in view of Micheli et al. (5,449,568). Regarding claims 90, 96, and 99, La Pierre discloses the use a hydrogen in the solid oxide fuel cells (SOFC) to generate electricity (Col. 2, lines 1-5) for the first fuel cell but fails to disclose a second fuel cell for oxidizing the second gas (CO<sub>2</sub>) stream to produce electricity. Micheli teaches a second gas stream (CO<sub>2</sub>) can be supplied to the second SOFC (Col. 5, lines 3-9) to provide electrochemical reaction during start-up to improve the efficiency of the fuel cell (Col. 6, lines 40-46) and generate electricity (Col. 6, lines 4-9). Thus, it would have been obvious in view of Micheli to one having ordinary skill in the art to modify the apparatus of the applied references with the SOFC of Micheli to generate electricity. With respect to the supplied air to first CO fuel cell prior to H<sub>2</sub> fuel cell, it would have been obvious to one having ordinary skill in the art to provide an air supply line to each fuel cell or a single air supply line cascading to a series of fuel cells to reduce piping cost. Regarding claim 97, the applied references fail to disclose the CO<sub>2</sub> output from one of the fuel cell, wherein the expansion of CO<sub>2</sub> produce additional energy. Micheli discloses the cathode exhaust stream (containing CO<sub>2</sub>) is used to drive a turbine 68 to produce additional electricity. Thus, it would have been obvious in view of Micheli to one having ordinary skill in the art to modify the apparatus of the applied references with CO<sub>2</sub> produces from the fuel cell as taught by Micheli in order to drive the turbine to produce additional electricity. Regarding claim 100, it is conventional



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to provide an air separation device to separate oxygen from other gas mixture and it would have been obvious to do so here to produce a enriched oxygen stream to facilitate the oxidation reaction in the fuel cell.

5. Claims 92 and 93 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applied references (La Pierre et al. '278 in view of Kaneko '768) as applied to claim 88 above, and further in view of Andrew (4,810,472). Regarding claims 92 and 93, the applied references fail to disclose a nuclear reactor for generating heat to heat a high molecular weight gas. Andrew teaches the product gas steam and reactants from the reformer can be heated by an external energy heat source such as a hot helium nuclear reactor coolant (Col. 2, lines 15-21) if heat recovery is not available for the reformer. Thus, it would have been obvious in view of Andrew to one having ordinary skill in the art to modify the apparatus of the applied references with a nuclear reactor as taught by Andrew in order to provide a heat source to heat the product gas stream and reactants.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom P Duong whose telephone number is (571) 272-2794. The examiner can normally be reached on 8:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The


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fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tom Duong  
July 26, 2004

TD



Glenn Caldarola  
Supervisory Patent Examiner  
Technology Center 1700